



COLONY OF SINGAPORE

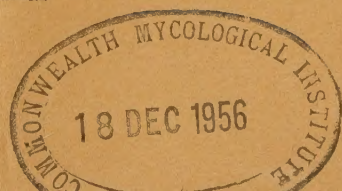
ANNUAL REPORT OF THE BOTANIC GARDENS DEPARTMENT FOR 1955

PRINTED AT THE GOVERNMENT PRINTING OFFICE, SINGAPORE,
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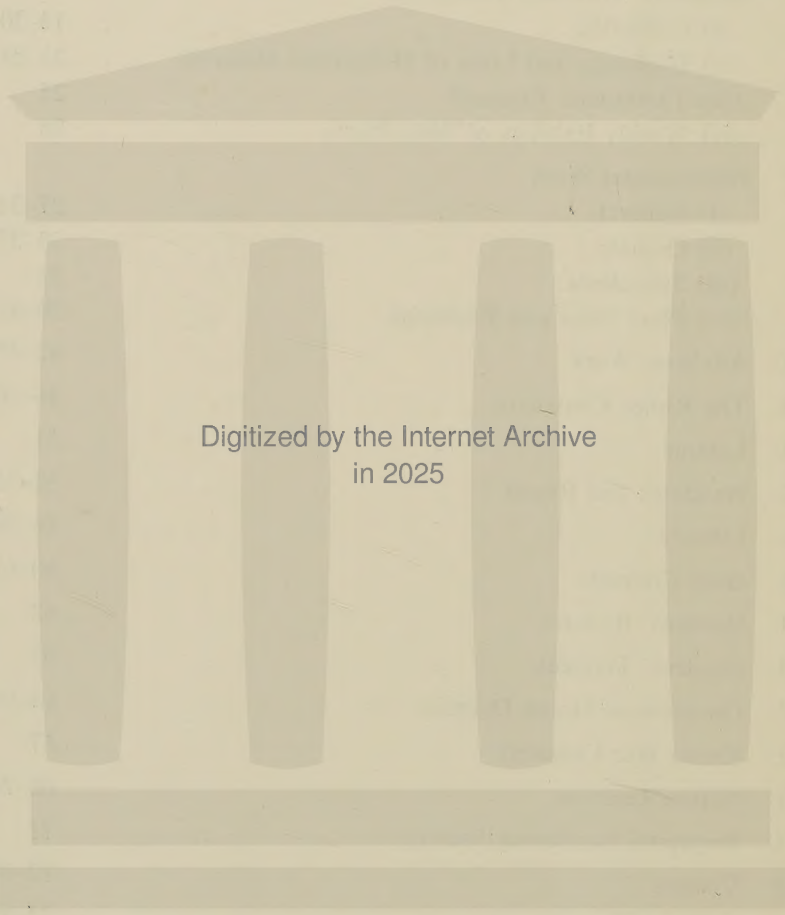
J. W. PURSEGLOVE
*Director, Botanic Gardens
Singapore*

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I. GENERAL

THE BOTANIC GARDENS had its full complement of senior staff for the first time for many years. It was thus possible to extend the work of the Department and good progress was made in several branches, more especially in increased plant collecting and in improvements to the Gardens. Even so, there are many pressing botanical problems, which cannot be tackled with the limited staff. Consideration is therefore being given to schemes designed to attract research workers from Britain and elsewhere to Singapore for one or two years to carry out botanical research in their specialized fields, with the object of increasing our output of research, and obtaining knowledge which would be of great value for the tropics as a whole; and of familiarising workers from temperate countries with tropical botany and stimulating their interests in our problems.

2. The great event of the year as far as the Botanic Gardens were concerned was the celebration of Mr. H. N. Ridley's hundredth birthday on the 10th December, 1955. Mr. Ridley was Director of the Botanic Gardens from 1888 until 1912 and was largely responsible for the founding of Malaya's rubber industry. An exhibition was staged at the Gardens to mark the occasion. Details are given in paras. 43-47 below.

3. Mr. E. J. H. Corner, Assistant Director of the Singapore Botanic Gardens, 1929-1946, and now Lecturer in Botany at Cambridge University, was elected a Fellow of the Royal Society in March. He thus becomes the third person connected with the Gardens to receive this honour. The others are Sir Stamford Raffles, who founded the first Singapore Botanic Gardens in 1822 and Mr. Ridley.

II. STAFF

4. All Division I officers were on duty throughout the year with the exception of Mr. Ewart, who returned from six weeks' vacation leave in New Zealand on the 18th January. Dr. C. X. Furtado, a re-employed pensioner, continued in his post of Assistant Botanist. Attempts to fill the post locally failed, as no one with the requisite qualifications was forthcoming. Dr. Anne Johnson worked temporarily as part-time Librarian from 1st February, 1955 to 15th September, 1955. Mr. H. M. Burkill, Assistant Director, acted as Director during my absence collecting in Sarawak in September.

5. Mr. A. G. Alphonso, Horticultural Assistant, spent the year at the Royal Botanic Gardens at Kew, continuing his course of training.

6. The British Empire Medal was conferred by Her Majesty the QUEEN in the Birthday Honours on Haji Mohamed Nur bin Mohamed Ghous, Herbarium Assistant. Haji Mohamed Nur has been on the staff of the Botanic Gardens since 1913, and as a boy helped Mr. Ridley with his now-famous rubber tapping experiments.

7. Ahmad bin Hassan, the oldest member of the staff, completed 54 years of service. He was first employed by Mr. Ridley as a Plant Collector in 1901 and accompanied Mr. Ridley on many of his historic expeditions of long ago, which added so much to our knowledge of the country's botany. 'Che Ahmad now spends his time collecting seeds for despatch to botanical institutions throughout the world. His great knowledge of living plants ensures that only authentic seeds are sent out and is also most useful to members of the staff on local excursions.

8. The Director acted as Chairman of the Committee on Animal and Vegetable Life and Resources of the Pan-Malayan Scientific Advisory Council during the second half of the year.

9. A list of the Divisions I to III officers is given in the Appendix I.

III. METEOROLOGICAL

10. The meteorological records for the year are given in Appendix II. The total rainfall was 102.35 inches compared with 117.00 inches in 1954 and the average rainfall in the past eleven years of 105.09 inches. Following the very heavy rains in December 1954 of 26.77 inches, January was unusually wet with 23.84 inches. Thereafter, February and March were much drier than usual; in fact the average monthly rainfall for the months February to June was below average. Consequently, the rainfall was much more seasonal than is usual in Singapore, and this resulted in a heavy flowering and fruiting, especially among indigenous plants, both here and in the Federation of Malaya. The highest rainfall in 24 hours was in July, when out of a total of 7.14 inches for the month, 5.20 inches fell in one day.

11. The highest shade temperature recorded during the year was 96°F. in May and the lowest was 71.2°F. in August; the mean maximum temperature being 86.9°F., the mean minimum 74.3°F., while the average temperature at 9.30 a.m. was 80.9°F. The mean relative humidity was 81.7 per cent.

IV. BOTANICAL WORK AND HERBARIUM

(i) COLLECTING

12. With more botanists now on the staff the amount of collecting done during the year was greatly increased. This adds much to the value of our work, as, not only is useful material added to our collections, but it is of great help in connection with our *Revised Flora of Malaya* and the *Flora Malesiana*. Duplicates are also obtained for distribution to, and exchange with other herbaria.

13. Three plants which are new to the Flora of Singapore Island were collected during the year. These were *Dipterocarpus apterus*, *Cyperus sanguinolentus* subsp. *cyrtostachys* and *Cymodocea rotundata*. The latter found at Teluk Paku is a marine flowering plant and is also a new record for Malaya. Considering the very extensive collecting which has been made in Singapore over the past 130 years and the continued clearing and destruction of vegetation, it is somewhat surprising that new records and sometimes new species can still be obtained on this small island. Two species of plants, which had not been found for many years, were also collected, namely, *Halophila spinulosa* at Tanah Merah Besar and *Cynometra ramiflora* in the Kranji Nature Reserve. Notes of all the above plants, together with other new records and rarities from Singapore, will be published in the next number of the *Gardens' Bulletin*. Another interesting discovery during the year was *Aponogetum lorae* in the Van Kleef Aquarium. Plants had been brought in from Kota Tinggi for growing in the aquarium tanks. This is a new record for Malaya, having only been found previously in New Guinea and S.W. Celebes in the Malaysian region. It reproduces abundantly by bulbils and flowered in the Gardens' laboratory. The Director made a collection of common Singapore weeds, and even in his garden found some species which had rarely been collected before in Malaya.

14. More collecting was possible in the Federation of Malaya than for many years. The principal collections there were as follows:—

Mr. Purseglove	... Fraser's Hill	... 15-26th April	... 250 numbers.
Mr. Burkill	... Pangkor Island	... 3-13th July	... 168 numbers.
Mr. Sinclair	... Malacca	... 1st-6th April	... 53 numbers.
Mr. Sinclair	... Trengganu	... 4-25th September	... 226 numbers.

15. In addition, Mr. Sinclair made five minor excursions to Johore, namely, two to Kota Tinggi and one each to Sungei Tiram, Sungei Tebrau and Pulau Pisang. From all the excursions a number of very interesting plants was brought back, including new records for the States concerned and a number of new species. Of the plants collected by Mr. Sinclair in Trengganu, 37 per cent were new records for that State and 11 per cent were new species. In this connection it should be remembered that Mr. Sinclair had previously collected in the same area in 1953 and 1954. While at Fraser's Hill, a friend brought the first plant specimen he had ever collected by himself to me. This was found to be a new species of *Fissistigma* and will be described by Mr. Sinclair as *F. thomasi* to commemorate the collector and this unique occasion. It can thus be seen that there is still ample scope for collecting in the Federation, particularly if the *Revised Flora of Malaya* is to be reasonably complete.

16. In Malaya the sides of most main roads, where they pass through forest or scrub, have been cleared of undergrowth to a depth of 1-2 chains as a security measure. In the Sungei Udang Forest Reserve Mr. Sinclair found that this had caused the trees of 60 to 100 feet in height to put out new branches close to the ground, thus facilitating collecting. It was in this forest that the collector had a somewhat close encounter with a bear, necessitating a quick exit, and the roadside fringe was found to be a better and happier hunting ground for botanical specimens. In Trengganu Mr. Sinclair collected between Kuala Trengganu and Besut, along the unhabited stretch of coast at Bukit Kluang and Bukit Bubus and at Sungei Nerus, which was reached by boat. Once more the Gardens are greatly indebted to Mr. Fyfe and 'Che Ibrahim, the State and District Forest Officers, for all their invaluable help during the Trengganu excursion.

17. The Director visited Western Sarawak during the period 12th-30th September and spent some days collecting in the vicinity of Kuching and thereafter at Lundu and Sematan and on Gunong Gading and Gunong Pueh (4,156 ft.). In all 501 numbers were collected with wherever possible five or six duplicates of each, in addition to a fair number of living plants for trial at the Gardens. The Sarawak Government, the Curator of the Kuching Museum, the Conservator of Forests, Mr. J. E. Seal and others provided most helpful assistance throughout this excursion. The very rich flora of Borneo is still very imperfectly known. In certain families as many as fifty per cent of specimens collected cannot be matched in Singapore and many of these will be species new to science. It was a particular interest to find *Rafflesia tuan-mudae*, close to where Beccari discovered it in 1866. Mention should also be made of *Hedyotis moultonii*, found on Gunong Pueh at 4,000 feet. It had only been collected once before and had been named and described by Ridley in 1939. The inflorescences of this plant, up to 2 feet in length and bearing small white flowers, sprawl on the forest floor and root at the tips, producing new plants, much in the manner of strawberry runners. The latter, of course, never bear flowers. It is obvious that a very great deal of collecting still remains to be done in Sarawak for many years to come.

18. Mr. Burkill has begun a collection of the Malayan seaweeds, a group of plants which had received little attention here in the past. He collected 12 species at Pangkor, all of which were new records for Perak and include *Ulva reticulata*, *Amphiroa fragilissima*, *Turbinaria conoides* and *Colpomenia sinuosa*.

(ii) EXCHANGE AND LOAN OF HERBARIUM SPECIMENS

19. The routine work of drying, poisoning and mounting specimens went on during the year. Some 2,351 sheets were mounted, but many of these could not be laid in their proper place in the cabinets, since these are now full and new cabinets are urgently wanted. We received 2,451 specimens in exchange from other herbaria or donated by individual collectors. The donors were the herbaria of the British Museum, Kepong Forest Research Institute, Hong Kong, Leiden and the Morris Arboretum; the Forest Departments of Bangkok, Lae, North Borneo and Sarawak; Lord Talbot de Malahide, British Ambassador to Laos, Mr. J. E. Seal of the Department of Civil Aviation, Sarawak, Mr. J. A. le Doux of Kota Tinggi and Mrs. B. E. G. Allen. Our grateful thanks are due to them for these valuable specimens. The Agricultural Department, Kuala Lumpur, kindly donated a number of sheets of Wray's specimens collected in the 1880's.

20. 2,167 duplicate specimens were distributed to the herbaria of Bogor, British Museum, Delhi, Edinburgh, Kepong Forest Research Institute, Kew, Leiden and Paris, compared with 3,321 in 1954. This decrease is due to lack of funds for postage and the fact that many of the collections made in 1955 were not ready for distribution at the end of the year.

21. The number of specimens sent out on loan to botanists working on the *Flora Malesiana* at Bogor, Cambridge, Kew, Leiden and to other specialists increased from 3,097 to 4,903. The families sent on loan were Flacourtiaceae, Malvaceae, Restionaceae and Bambusae, some Dipterocarpaceae and Ericaceae and the genera *Calophyllum*, *Kayea*, *Ochrocarpus* and some *Ficus* spp. It adds greatly to the usefulness and value of our herbarium when these specimens are returned correctly annotated.

22. In addition to providing herbarium material on loan or exchange for study by research workers in other countries, many requests were received for living plants, seeds and spirit material for study by specialists elsewhere, and wherever possible the material required was provided. The Gardens co-operated fully with the Botany Department of the University of Malaya and provided material for class work and research.

(iii) TAXONOMIC RESEARCH

23. Mr. Sinclair continued his revision of the Malayan species of Myristicaceae (nutmeg family) and his manuscript was nearly completed by the end of the year. Dr. Furtado completed his long paper on *Calamus*, the rattan genus of palms, and it has now gone to press. In the revision there are 72 species of *Calamus* in Malaya compared with 46 in Ridley's *Flora*, while two of the latter have been transferred to the new genus *Cornera*. In addition to their research, the Keeper of Herbarium and the Assistant Botanist have carried out routine determinations of the in-coming specimens, while the Director and Assistant Director have named their own collections. Certain species collected have been sent to experts in various parts of the world working on individual groups or families for critical determination.

(iv) WEEKLY EXHIBITS OF WILD PLANTS

24. The weekly exhibit of seven wild plants in the plant house begun in November, 1954 was continued throughout the year. It continued to be popular and has stimulated interest in the local flora.

V. HORTICULTURAL WORK

(i) GENERAL

25. Clearing of thickets, cutting of grass and the sweeping of leaves occupied much of the time of the general labour force. The greater part of the clearing was done on lawns W, X and Y, which have been somewhat neglected in the past. A considerable amount of wanton damage was done in the nursery and the pot plants were moved from there to the orchid enclosure. It is still necessary to maintain sufficient stocks of planting material in the nursery beds, both for Gardens' requirements and for sale, and it is desirable that the area should be enclosed with a security fence. With the employment of a new pot-plant gardener and their removal to the orchid enclosure, the standard and range of pot plants has improved. Two large *tembusu* trees (*Fagraea fragrans*) in the Arboretum were uprooted with a Trewella winch, which effected a great saving in labour. The trunks were cut up into suitable lengths and used as posts for the new pergolas in the plant house. Adequate spare-parts were available for the motor mowers, with the result that there were few stoppages and lawns for the most part were kept in good condition. Exceptions were lawns P, Z and Y, where conditions are too rough for existing machines and a strong motor scythe is required for this work. Now that ample quantities of animal manures are available composting is being done on a greatly increased scale. To save transport and labour, compost heaps were made on various lawns throughout the Gardens. They can be kept tidy and it is hoped that they will serve as an object lesson to visitors.

26. Inevitably in a large plant collection such as this, with over 3,000 species growing in the Gardens—and this does not include annuals and hybrids—losses occur from time to time. The more serious losses during the year were *Araucaria braziliensis*, which died on Lawn C and the Seychelles double coconut or *coco de mer* (*Lodoicea seychellarum*), which was killed by red-stripe weevils (*Rhynchophorus schach*) on Lawn K, while the second specimen of this species was killed by falling branches of *Kurrimia paniculata* near the Cluny Road entrance, which blew down in December and which also necessitated the cutting down of this very fine tree. Fortunately four seeds of the double coconut had been obtained from the Seychelles and were planted on Lawn W. The avenue of sugar palms (*Arenga saccharifera*) along the road to the Tyersall Gate had to be taken out in making the new orchid enclosure. These palms usually flower and die after about 25 years, and as flowering had already begun they would have had to have been taken out soon in any case.

27. All the time new plants are brought in for trial and after establishment are planted out in the Gardens. Among these a white variety of *Petraea volubilis* was planted on Lawn H and a fine new *Mussaenda* "Dona aurora" is now well established. *Mucuna rostrata*, the seeds of which had kindly been sent in March 1954 by Dr. Herklots, Principal of the Imperial College of Tropical Agriculture, Trinidad, flowered for the first time at the end of the year. Although the inflorescence is not as big and the flowers not as brilliant as *Mucuna bennettii*, nevertheless, its waxy orange flowers are most attractive. A different species of creeper was planted at each of the *tembusu* posts on the

new pergola in the plant house and were as follows: *Anthurium digitatum*, *Argyreia nervosa*, *Beaumontia murtonii*, *Combretum farinosum*, *Hieris curtisii*, *Hosea lobbii*, *Mandevilla suaveolens*, *Odontodenia speciosa*, *Pandorea pandorana*, *Pergularia odoratissima*, *Petreovitex wolfei*, *Philodendron imbe*, *P. lacerum*, *P. laciniatum*, *P. oxycardium*, *P. sagittifolium*, *P. squamiferum*, *Rhapidophora korthalsii*, *R. maingayi*, *Scindapsis aureus*, *Solandra grandiflora*, *Solanum seaforthianum*, *S. wenlandii*, *Strongylodon macrobotrys*, *Synгонium auratum* and *S. podophyllum*.

28. A fine-leaved variety of *Zoysia* has made an excellent lawn at the plant house and it is a great improvement on any other grass used for lawn making in Singapore. The beds along the Main Gate Road, which had grown Cannas for very many years were dug up and rested from February to November. They were then heavily manured and each bed replanted with a different Canna variety. New Canna beds were also made on Lawn O surrounding the bandstand and provide welcome colour at this central and conspicuous point in the Gardens. The Lotus (*Nelumbium speciosa*) spread with alarming rapidity over the greater portion of the lake and threatened to suppress the waterlilies. They were controlled temporarily by cutting, as it was impossible to lower the lake level for more than a few days to root them out and weeding had to be restricted to that which could be done from the boat. *Bougainvillea glabra* var. *magnifica* has long been difficult to root, but it was found that young soft shoots, about 3 inches long, root fairly easily in burnt earth in full exposure. *Grammatophyllum speciosum*, the largest indigenous Malayan orchid, flowered profusely throughout the Gardens from October to December. In the Gardens' Jungle, a tree of *Homalium grandiflorum* var. *grandiflorum* flowered profusely at the end of July. According to Ridley, the tree flowers rarely, probably once in twenty-five years.

29. A trial of maleic hydrazide, a growth inhibitor, was carried out on grass plots containing *Axonopus compressus*, *Chrysopogon aciculatus*, *Ischaemum timorense* and some sedges. Applications were made at the rate of 5, 10 and 12 pounds per acre, together with control of untreated plots. In the treated plots the flowering of the *Chrysopogon* was much reduced, but the growth of leaf of all grasses was not noticeably inhibited.

30. The wild longtailed macaque monkeys (*Macaca irus*) increased considerably during the year. While providing a very great attraction to visitors, they are an unmitigated nuisance as far as horticulture is concerned and do a great deal of damage to plants and fruits. A few vicious males were shot during the year, but their numbers should be reduced.

(ii) ORCHIDS

31. At the beginning of the year most of the Gardens' collection of cultivated orchid species and hybrids was transferred from the Director's garden to the new orchid enclosure on lawns P and R. Separate structures were erected for the orchids growing in the hanging pots, as the *Dendrobiums* require full sun and the strap-leaved *Vandas* prefer half shade. Beds were dug for planting terete and semi-terete *Vandas*, *Arachnis*, *Renantheras* and their hybrids. Many tons of compost were required and this was made by utilising all refuse and grass cuttings, together with cattle manure from the Animal Quarantine Station and horse manure from the Singapore Turf Club. Most of the orchids have benefitted from the move, the more robust and healthy growth of the *Dendrobiums* being particularly noticeable. The new site is obviously better than the old one. There is also room for expansion and less likelihood of theft or damage.

32. During the year 215 pollinations were made, of which 70 of the crosses have produced good viable seeds and are now growing in flasks. Seeds from the cross *Euanthe sandariana* x Vanda Tan Chay Yan are growing well and the results may well be spectacular. Three very good hybrids—Vandanthe Nellie Morley, Vanda Jean Kinlock Smith and Dendrobium Pompadour var. Phra Taba have so far not produced any fertile seeds when crossed with other species and hybrids. Good plants were received of Vandanthe Nellie Morley, Hawaii's best semi-terete hybrid, and *Euanthe sandariana* in exchange for plants of Vanda Tan Chay Yan, while reciprocal exchange was arranged with Messrs. William Kirch of Hawaii, from whom were received some of the latest Hawaiian hybrids. A number of new hybrids flowered for the first time, of which the best were: Dendrobium Gillian, (D. Caesar x D. Champagne), which is more robust than Dendrobium Caesar, although resembling it in colour: Aeridanchnis Sweet Maggie (Arachnis Maggie Oei x *Aerides odoratum*) with small attractive flowers which are very freely produced; Dendrobium Lim Chong Min (*D. phalaenopsis* var. *schroederianum* x D. Caesar) which is far superior to an earlier cross made with *D. phalaenopsis* var. *alba*; and *Dendrobium undulatum* selfed, of which an orange-brown variety stayed in bloom for over two months. Descriptions of the new orchid hybrids were published in the *M.A.H.A. Magazine* of the Malayan Agri-Horticultural Society.

33. Vanda Tan Chay Yan continues to be very popular, both locally and overseas, and the demand for plants exceeds supplies. Shoots (anaks) are not easily produced from the base of cut plants, but this was accelerated by using the paste of Hortomone A with water, which was copiously applied to the axils of the leaves and nodes.

34. When there is unavoidable delay in potting up seedlings from the flask stage these tend to shrivel. This was remedied by feeding with organic fertilizers, usually fish emulsion. The use of Vacin's formula for the flasks was continued, but the incorporation of fish emulsion during growth is found to be beneficial. In the seedling houses the seedlings received weekly dressings of solutions of inorganic fertilizers. Trouble was still experienced with the drainage holes of the thumb pots being blocked by algae, but this was overcome by putting the pots in a layer of coke about two inches deep, and the plants made excellent growth. Sterameal was used for feeding the larger seedlings.

35. Selected orchid flowers have been sent from time to time to the fortnightly shows of the Royal Horticultural Society in London and also the Chelsea Show. On several occasions the blooms arrived in poor condition, although Dendrobium Caesar was given special mention. Bouquets of orchids were also sent on occasions to Malaya House in London and were displayed in their window facing Trafalgar Square. Orchids from the Gardens were also exhibited at flower shows in Karachi and Sydney. One of the new hybrids, Arandanthe Tyersall var. Bulan, was awarded a cup for the best hybrid produced in Malaya and Java at the Singapore Flower Show.

(iii) SUCCULENTS

36. A new succulent house was built in the orchid enclosure and most of the collection was moved down from Lawn X. The number of species grown was added to during the year by seeds sent in exchange by Botanic Gardens elsewhere and we now have some 400 species. Most cacti and other succulents grow surprisingly well in Singapore, provided they are sheltered from the rain, and the new open-sided house with a glass roof suits them admirably.

Exceptions are the stone plants, belonging to the genera *Argyroderma*, *Conophytum* and *Pleiospilos*, and these will not be tried further. The popularity of succulents among local growers continues to increase and we could not meet all the requests for the purchase of plants. In fact it was found necessary to stop all sales in the middle of the year in order to conserve our collection. With the new house, however, increased sales can be expected in 1956.

(iv) PLANT SALES AND EXCHANGE

37. Plant sales during the year totalled 2,730 orchids (plants, cuttings and seedlings), 874 succulents and 24,224 miscellaneous plants. The revenue obtained was \$22,187, compared with \$19,416 in 1954. This increase was due to orchid sales which produced \$16,005, an increase of \$4,085 over the previous year. We provided 6,979 plants free of charge to Government institutions and schools.

38. 514 packets of seeds and 113 plants were despatched on an exchange basis and 362 packets of seeds and 371 plants, including gifts, were received in return. A list of the institutions and persons with whom planting material has been exchanged and who have donated plants and seeds is given in Appendix III. Members of the staff brought back living material of 83 species from their various expeditions, many of which are new to the Gardens.

39. During the year 3,300 potted plants were loaned for Government and charity functions, while plants were also provided for the Chief Minister's Office.

VI. ADVISORY WORK

40. The Rural branch of the Public Works Department was in constant contact with the Department and the planning of layouts for roadsides or open spaces was carried out. In Nicoll Drive alone 370 trees were provided free of charge by the Gardens Department. They consisted of 75 *Terminalia*, 70 Royal palms, 46 *Peltophorum*, 138 Tamarinds, 4 *Delonix* and 40 *Arfeuillea*, while many more are still to be planted. 200 to 300 shrubs were planted along the Bukit Timah Road near the turnabouts, thus continuing the work begun last year, and still more remains to be done.

41. Contact was maintained as usual with the City Council Parks Department and information and plants were exchanged. Advice was given, and in a number of cases plans were submitted to institutions, such as the School for the Blind, the Civil Defence, the Auxillary Fire Service and many other public bodies.

42. The large *Ficus religiosa*, which was transplanted in the Paya Lebar International Airport in 1954, did not survive, but marcots from the original tree are growing satisfactorily.

VIII. THE RIDLEY CENTENARY

43. On the 10th December, 1955, Mr. Henry Nicholas Ridley, C.M.G., M.A., F.R.S., F.L.S., the first scientific director (1888-1912), celebrated his hundredth birthday anniversary at his home at Kew in England. The Gardens marked the occasion by a Ridley Centenary Exhibition held from the 10th-15th December in the herbarium, library, laboratory and offices. In this was demonstrated some of Mr. Ridley's major contributions to the knowledge of the natural history of Malaysia and his pioneer work on rubber, which led to the



Mr. David Marshall, Chief Minister of Singapore, congratulating Mr. H. N. Ridley, C.M.G., F.R.S., Director of the Singapore Botanic Gardens 1888-1912, on his hundredth birthday and presenting him with a Kelantan silver tea service at Mr. Ridley's home at Kew



Public Relations

His Excellency the Governor of Singapore, Sir Robert Black, signing the visitors book at the Ridley Centenary Exhibition, 10th December, 1955



Public Relations

Tuan Haji Mohamed Nur bin Mohamed Ghous, B.E.M., Herbarium Assistant and Che Ahmad bin Hassan, Seed Collector, who have completed 43 years and 54 years service respectively at the Singapore Botanic Gardens



Public Relations

Director's Office and Laboratory, Singapore Botanic Gardens, with herbarium behind



Public Relations

Mounting herbarium specimens, Singapore Botanic Gardens



G. H. Addison

Beaumontia murtonii Craib, a handsome woody climber. It was named in honour of W. J. Murton, Superintendent of the Botanic Gardens, Singapore 1875–1880, who first collected it



G. H. Addison

Avenue of Royal Palm—*Roystonea (Oreodoxa) regia*, 5 years old, on the Office Gate Road, Singapore Botanic Gardens

founding of Malaya's principal industry. Past and present work of the Department was also shown. H. E. the Governor and Lady Black, the Commissioner-General and Lady Scott, and some 600 invited guests visited the exhibition, which was thrown open to the public on 15th December. The Government Printer very kindly printed a brochure to commemorate the occasion, a copy of which was given to the guests and also distributed overseas. A copy bound in green morocco leather was presented to Mr. Ridley.

44. On the evening of the 10th December over 100 guests attended a cocktail party in the Director's house, where Mr. Ridley had lived for twenty three years. Proposing Mr. Ridley's health, H. E. the Governor, Sir Robert Black, said that Mr. Ridley, "was in the best tradition of those who over the years have come from overseas to serve Malaya, whatever criticisms may now be levelled at their heads, in that he placed obligation above privilege, and found his best reward in the prosperity and increasing well-being of the people of the country . . . I am sure that everyone will join with me in congratulating Mr. Ridley, who has made such an outstanding contribution to the wealth and knowledge of Malaya and Singapore, on this very happy occasion of his centenary."

45. The portion of the Gardens along the Office Ring Road, the Lower Ring Road and adjacent areas, as well as the office and herbarium buildings and plant house, were floodlit for eight nights during 10th-17th December and attracted large crowds. Floodlighting of some of our very fine trees, such as *Hymenaea courbaril*, *Koompassia malaccensis* and *Terminalia subspatulata*, provided some very beautiful effects which will long be remembered. Mr. Siddaway, Electrical Engineer of the Public Works Department, and his staff are thanked for installing the apparatus. Four concerts beginning at 9 p.m. were given during the week by the following bands: The Band of the 1st Battalion of the Queen's Royal Regiment, in conjunction with choral items given by the Singapore Chamber Ensemble, The Singapore Police Force Band; the R.A.F. Band of the Far East Forces and the Royal Marine Band of the Commander-in-Chief of the Far East Station. To them our thanks are due.

46. Radio Malaya produced an hour's feature programme entitled, "They Called Him Mad" for the occasion, which included the recorded voices of Mr. Ridley himself, Sir Richard Winstedt, R. J. Farrer, Ahmat bin Hassan, R. E. Holtum, Young Chao Sian (118 year-old Chinese calligraphist), Dr. Howes, Tan Hoon Siang, Gerald Hawkins and J. W. Purseglove. The Director also made other broadcasts for Radio Malaya and the B.B.C. Mr. David Marshall, Singapore's Chief Minister, presented Mr. Ridley personally with a silver Kelantan tea set on the birthday, while the Gardens sent a bouquet of Singapore orchid hybrids. The Rubber Growers' Association gave him a bronze bust of himself, while a further bust will be placed in their London headquarters.

47. Among the many congratulatory telegrams received by Mr. Ridley was one from Her Majesty the Queen. Sir Richard Winstedt described him recently as "the one man whose influence on Malayan history is second only to that of Raffles". The staff at the Gardens have every reason to be proud of Mr. Ridley, not only for his great achievements and all that he did for us and Malaya so long ago, but also for his remarkable longevity. It was good to hear from Mr. Ridley that "my hundredth birthday was one of the most enjoyable days of my life".

VIII. LABOUR

48. The average daily-rated staff at the Gardens was 78. A total of 221 man-days was lost on account of sick leave, as well as a great deal of time lost by people spending three to four hours attending the hospital for minor treatment, not covered by sick certificates. Wages amounted to \$110,639 during the year. At Government House the average labour force throughout the year was 57. Their health remained good. No labour trouble occurred at either place.

IX. BUILDINGS AND ROADS

49. Re-decorating of the offices and herbarium was completed early in the year, as was the building to house the spirit collection, which is now used temporarily as a library. This building is connected with the herbarium by a covered passage and later a small fumigation chamber was added to the end of it. This has been required for many years, as it is essential that herbarium specimens sent to us from other countries for study, or for incorporation in our collection, should be thoroughly fumigated, as should new gatherings by the staff, in order to prevent insect infestation which could so easily and so quickly do untold damage. Similarly it will be very useful for checking outbreaks of insect pests which damage our books and papers and for fumigating introductions of live plants. The chamber was so designed that methyl bromide and other fumigants can be used. The main buildings at the Gardens in their new colours fit in very well together and with their surroundings. They form an attractive group. The plant house, tea-kiosk and bandstand were also re-decorated during the year.

50. Work continued on the pergolas at the plant house. Two old pipe and angle-iron archways were removed, as were mounds and benches. The new flat-topped pergolas of *tembusu* poles are a very great improvement. The east side of the plant house still remains to be re-constructed. The old iron archway on Lawn O was demolished and replaced by a flat-topped brick and *tembusu* structure. Unfortunately the money voted as special expenditure to re-roof the almost-derelict fern and orchid house was withdrawn on the grounds of economy.

51. The part of the Gardens which has developed most during the year is the new orchid enclosure, made at the end of 1954 by enclosing Lawns P and R with a wire mesh security fence with a double barbed-wire apron. The fence itself was made "monkey-proof" by electrifying two of the top wires. This has proved very effective and the cost of doing so will be saved in one year from the over-time which was paid employing a labourer throughout the daylight hours to keep the monkeys out of the enclosure. Within the enclosure structures were erected for the hanging orchids, benches were transferred and constructed for the orchids in pots and other pot-plants, two potting sheds (one for orchids and the other for miscellaneous plants), a cactus house and a shed for burning earth were built. Cement water tanks were constructed and the central tank in the Gardens' Jungle was connected to the city water supply, which can now be used in an emergency, should the present supply pumped from the lake fail at any time. The centralising of the main work on orchids, pot-plants and new introductions within the orchid enclosure has obvious administrative advantages and permits closer supervision.

52. No work on roads, paths and drains was done by the Public Works Department during the year, but the Gardens' staff repaired the brick drains

where necessary. Sodium chlorate was used to keep down weeds on those paths which do not drain into the lake, but cannot be used on those which do, as it might kill plants and fish. The path on the east side of the plant house, which was dangerous when wet, was dug up, levelled and relaid. Baskets for litter were put up at strategic points within the Gardens; previously none has been provided. It now remains to be seen whether the public will use them.

X. LIBRARY

53. Dr. (Mrs.) A. Johnson, was engaged as a part-time librarian for 7½ months and catalogued the library. The last published catalogue was done in 1898. The books were classified on the Universal Decimal System and were found to number some 8,000 bound volumes. There is in addition the very large number of volumes waiting to be bound. Our oldest book was found to be Paulus Aeginetes' *Pharmaca Simplicia* and *De Retione Victus*, which was published at Strasburg in 1531. Our collection includes many eighteenth and early nineteenth century publications, many of them with handsome coloured plates, which are very valuable and many of them now unobtainable. Seventy books were added to the library during the year.

54. The new room, built to house the spirit collection of plants, was air-conditioned and fitted with new book cases. It is being used temporarily to house the more valuable books and those in more general use, until such time as a new library is built. According to the development plan this is scheduled in 1957. The present building will only hold part of the library and there is no room for expansion. A man was fully employed for the whole year hand-poisoning all the library books and this, together with the removal to the air-conditioned room, has halted the delapidations recorded in last year's report.

55. It is estimated that there are about 1,000 volumes waiting to be bound, both periodicals and old volumes in need of rebinding. The back-lag is a matter of some concern. The Government Printer bound a few volumes during the year, but it is obvious that he cannot cope with the great amount to be done, and failure to bind them will result in further deterioration. In addition it makes reference work very difficult and tedious and much time is wasted searching through piles of unbound periodicals.

56. Exchange arrangements with scientific institutions for the *Annual Report* and *Gardens' Bulletin* were reviewed during the year. A circular was sent out with last year's *Annual Report*, asking institutions if they wished to receive one or both publications and what they could offer in exchange. Reciprocal exchange was reconfirmed or was proposed and accepted with 117 overseas institutions, while negotiations with a few others are still in progress. In this way it has been possible to augment the number of useful periodicals received by the library. There is insufficient money in the library vote to pay for binding or to purchase all the books which should be added to the library.

XI. BAND CONCERTS

57. Concerts by the military bands on duty in Singapore were begun on the 20th February and were continued during the year on alternate Sundays at 5 p.m., thanks to the courtesy of the General Officer Commanding the Singapore Base District, Major-General D. D. C. Tulloch, C.B., D.S.O., M.C. The concerts have proved extremely popular and very large crowds have come to

listen to them, sometimes as many as 2,000 people. Since the founding of the Gardens on their present site in 1859, concerts in the bandstand have been a regular feature, although there had been periods when no band has performed. The last concert had been given early in 1953 and it is pleasing to report that their resuscitation has proved such a great attraction.

58. The bands of the following regiments performed during the year: 15/19th The King's Royal Hussars, 11th Hussars, 1st Battalion, The Royal Scots Fusiliers, 1st Battalion, The Royal Hampshire Regiment, 2nd Battalion, Royal Welch Fusiliers, 1st Battalion East Yorkshire Regiment, 1st Battalion, Northern Rhodesia Regiment, 1st Battalion, The Queen's Royal Regiment, 1st Battalion, The King's Own Scottish Borderers and the 1/10 Gurkha Rifles. The King's Own Scottish Borderers, in addition to providing band items, also performed a set of pipe tunes and sword dance by four pipers in full dress, while the Northern Rhodesia Regiment gave an impressive display of marching on the Upper Ring Road. The Commanding Officers of the above regiments and the bands are thanked for providing many excellent and colourful concerts.

XII. GARDENS' BY-LAWS

59. As reported last year no new by-laws have been made since 1922, and the governing principal legislation, the Raffles Society Ordinance of 1878, is under revision.

XIII. GARDENS' TRAINEES

60. During the year fifteen trainees were accepted from the Singapore Anti-Tuberculosis Association and the Rehabilitation Centre of the Labour Department. They spend six months at the Gardens and receive instruction in the various sections to which they are attached.

XIV. GOVERNMENT HOUSE DOMAIN

61. The grounds were kept in their usual good condition. The most notable improvement during the year was the removal of the old rockery round the pool on the top lawn and the concrete divisions in the pond itself. The area round the pool was then levelled and turfed. This work improved the vista from the front of Government House. At a small cost it had provided a simple dignity which was previously lacking. The pergolas now play a very essential part in the design, and the *Mucuna bennettii* on them flowered well, more especially towards the end of the year, when the weather was cooler and wetter. The design of the 'new garden' was also improved by the removal of the standard *Hibiscus*, which broke up the lawn, and by replacing the long mixed herbaceous borders along the top of the bank with two small beds of *Mussaenda erythrophylla*. The triangular section near H. E.'s Office was re-modelled and part of it was turned into a car park. A new hedge of *Baphia nitida* planted near the second gate is forming a good screen.

62. With the purchase of a Dennis motor mower with two wide-cuts, it was possible to give more attention to, and to improve the large grass areas in the outlying portions of the Domain. During the long dry spell in March many lawns suffered and turned brown, an unusual occurrence in Singapore. Adequate supplies of spent hops, horse manure and cattle manure were obtained for the Domain and large quantities of compost were made. The plant house in the potting yard was repaired by the Public Works Department and the foliage plants improved considerably when transferred to it from under the trees where

they had been growing for some months. The supply of cut flowers was increased and pot plants and vegetables were provided as usual. Work was also done at the Changi Cottage.

63. Some repairs and improvements were made to the grounds of the Speaker of the Legislative Assembly's residence at 172 Mount Pleasant Road, for which a small additional vote was provided.

XV. KRANJI WAR CEMETERY

64. The Director of Botanic Gardens, with the approval of the Singapore Government, became the Imperial War Graves Commission's representative in Singapore to take charge of the care and maintenance of their Kranji War Cemetery. The Gardens took over the administration and work at the cemetery from the 1st June, 1955, funds for the upkeep being provided by the Imperial War Graves Commission. Work continued on the regrading of the cemetery and the replanting of the lawns with *Axonopus compressus*. This was nearly completed by the end of the year. The replanted area was top-dressed with sludge purchased from the City Council, and resulted in a strong growth of rich, green grass. Trial plots of lawn grasses of *Zoysia* sp. and *Cynodon dactylon* were laid down. A large number of shrubs and herbaceous perennials was planted in headstone borders according to the Commission's plans.

XVI. NATURE RESERVES

65. The Board of Trustees of the Nature Reserves met on three occasions to conduct business, namely, 31st January, 2nd May and 17th November. A meeting arranged for the 29th July had to be cancelled as no quorum could assemble. Mr. John Laycock and Mr. C. C. Tan resigned from the Board of Trustees on the 4th April and 15th July respectively. Their places, available to the Legislative Assembly, remain vacant. Mr. A. Thompson of the Department of Botany of the University of Malaya retired from the Board on 28th June on the expiry of his term of office and his place has been taken by Dr. H. B. Gilliland, the new Professor of Botany, from the 24th September. Mr. R. S. Boswell acted for Mr. A. L. B. Swaine as representative of the Rural Board during the latter's absence on leave. Mr. Yap Pheng Geck, representing the City Council, and Mr. M. W. F. Tweedie, a Governor's nominee, served throughout the year. The Director of Botanic Gardens was *ex-officio* Chairman.

66. Supervisory staff was appointed in the employ of the Board with effect from 1956. Seven labourers at Bukit Timah and two at Kranji were employed during 1955, and in these reserves no major acts of vandalism or timber cutting occurred. At Pandan some cutting continued and encroachment by prawn ponds occurred at two points in the Pengkang sector. A corner of the Kranji Reserves was cut for road widening and realigning operations by the Public Works Department. Unfortunately this destroyed three of the four known specimens of *Cynometra ramiflora* on Singapore Island.

67. The Police continue to use the summit on Bukit Timah as a radio station. The approach road to the summit through the Hindhede Quarry was closed due to quarrying downwards and an alternative trace was made by the Company from the Reserves' labour quarters. Owing to the excessive gradient, this was found to be expensive to maintain and unsafe, particularly in wet weather, for any transport except four-wheel drive vehicles. Consequently, the old road through the quarry will be maintained, culverts being constructed wherever quarrying cuts into its course. It is hoped that the threat of quarrying

which has hung over Bukit Timah for many years, and which has so disfigured the hill, will be diminished now that the Hindhede Quarry will only be allowed to work downwards and at least two of the other quarries will be closed. The Bukit Timah bungalow and its land (Lot 67-31) has now reverted to the Crown and formal application has been made for it to be included in the reserve. The bungalow would provide a useful resthouse for scientists and others.

XVII. SINGAPORE GARDENING SOCIETY

68. The membership of the Society increased to 245 by the end of the year. Seven of the monthly meetings were held at the Botanic Gardens. A very successful flower show was held at the Happy World Stadium on the 1st-3rd April. Although the number of entries was slightly fewer than the previous year, the quality of the plants was higher and competition was keener, more especially in the orchid section. Mr. J. W. Ewart was President for the Society for the year 1954-1955 and was also Chairman of the Flower Show Committee. Mr. G. H. Addison and Mr. J. L. Pestana were Honorary Show Manager and Assistant Show Manager respectively and several members of the Gardens' staff acted as judges.

XVIII. VISITORS

69. A large number of visitors, both official and casual, came to the Gardens during the year and were shown round by the Director or members of the staff. Visitors from overseas included: Professor H. G. Champion, Director of Imperial Forestry Institute, Oxford University, Mr. F. S. Collier, Forestry Adviser to the Secretary of State for the Colonies, Dr. L. T. Ride, Vice-Chancellor of the University of Hong Kong, Miss Dinah Sheridan, film-star, Mr. John Davis, Managing Director of J. Arthur Rank Organisation, Mr. G. W. Nye, Deputy Agricultural Advisor to the Secretary of State for the Colonies, Lord Talbot de Malahide, British Ambassador to Laos, Professor R. Cerignelli, Marseilles University, Dr. Marta Woermann, Heidelberg, Dr. Jose Trujillo, Ecuador Ambassador to the United States of America, Dr. Viquia, El Salvador Ambassador to the United States of America, Dr. P. Wiehe, Director of the Sugar Research Institute, Mauritius, Mr. D. B. Paguirigan, Director of The Bureau of Agricultural Extension, Philippines, Mr. Con O'Neill, British Charge d'Affaires at Peking, Dr. Wm. Beebe of the New York Zoological Society, Mr. G. Clutton, British Ambassador to the Philippines, Professor W. E. Meserve, Cornell University, Lady Patricia Lennox-Boyd, Mons. Saphon, Directeur de Service Veterinaire, Cambodia, Mons. Sayang, Directeur de l'Ecole Nationale d'Agriculture, d'Elevage et de Sylviculture, Cambodia, Dr. R. Aitken, Vice-Chancellor of Birmingham University, Professor Jitsuro Ueno, Osaka City University, Sir Edward Boyle, Financial Secretary to the United Kingdom Treasury, Professor C. F. Schmidt, University of Pennsylvania, Mr. K. Suvatabandhu, Chief of the Botanical Section, Agricultural Department, Bangkok, Dr. C. F. Hickling, Fisheries Adviser to the Secretary of State for the Colonies, Mr. J. E. Mayne, Colonial Office, Mr. Stuart Hood, Head of the B.B.C.'s Overseas Service, Professor H. W. Anderson, University of Illinois and Mr. Young Chul Chang, Head of Agricultural Technical Institute, Korea.

70. Visiting botanists worked for varying periods in the herbarium during the year. They, together with the group of plants studied, included: Mrs. B. E. G. Allen (ferns), Dr. G. A. Prowse (fresh-water algae), Professor K. N. Kaul, Director of the Lucknow Botanic Gardens (palms), Mr. J. Wyatt-Smith

of the Kepong Forest Research Institute (Calophyllum), Professor H. B. Gilliland, University of Malaya (Singapore plants), Dr. P. B. Tomlinson of Leeds University (palms), Mr. M. Jacobs of Leiden (Malpighiaceae), Dr. J. Fogg, Director of the Morris Arboretum, United States of America (Rauwolfia) and Mr. N. W. Simmonds, Senior Cytogeneticist of Banana Research Scheme, Trinidad (bananas).

71. Dr. Prowse, Botanist/Algologist of the Malacca Fish Culture, Research and Training Institute arrived in Singapore on 7th November, and is working temporarily in our laboratory until accommodation is available for him at Malacca. He has made many interesting discoveries among the fresh-water algae in the Gardens' lake and elsewhere in Singapore and Malacca. Dr. Tomlinson of Leeds University, who is working on the anatomy of palms at the University of Malaya with an Agricultural Research Council scholarship, spent some time in the herbarium and Gardens, working in conjunction with Dr. Furtado, Assistant Botanist, a world expert on the taxonomy of palms.

XIX. PUBLICATIONS

72. The second volume of the *Revised Flora of Malaya* on the *Ferns of Malaya* by Professor R. E. Holttum, was printed by the Government Printer in 1954 and issued early in the year. It embodies the results of some 30 years' research on this interesting group by Dr. Holttum, together with new ideas on their classification, and includes an Appendix on the *Cytology of one hundred Malayan ferns* by Professor I. Manton. The volume contains 643 pages and some 650 species of Malayan ferns are described, while keys are provided for their identification.

73. A lengthy number of the *Gardens' Bulletin*, Vol. XIV No. 2 was published in February. This includes a long paper by Mr. Sinclair on the revised taxonomy of the Malayan Annonaceae. The book on *Malayan Orchid Hybrids* by G. H. Addison and M. R. Henderson, in which all the orchid hybrids grown in Singapore are illustrated, went to press and publication is expected in mid-1956. Booklet III of *Malayan Garden Plants—Ten Orchids* was reprinted by the Government Printer. The revenue from the sale of publications at the Gardens was \$864.

74. The following articles were published by members of the staff during the year:—

ADDISON, G. H.—Cactus and succulents in Malaya. *M.A.H.A. Mag.*, XII, No. 1, 13–15, No. 2, 21–23; No. 3, 22–23.

ADDISON, G. H.—New Orchid Hybrids raised and flowered in Singapore. *M.A.H.A. Mag.*, XII, No. 2, 14–16; No. 3, 14–15.

EWART, J. W.—Saintpaulias, *M.A.H.A. Mag.*, XII, No. 1, 16–17.

EWART, J. W.—Potted flowering plants, *M.A.H.A. Mag.*, XII, No. 3, 24–27.

FURTADO, C. X.—*Palmae Malesicae*—XVIII. Two new Calamoid genera of Malaysia. *Gardens' Bull.*, XIV, 517–529.

GERRARD, ANNE (Dr. A. Johnson)—The germination and longevity of seeds in an equatorial climate. *Gardens' Bull.*, XIV, 534–545.

PURSEGLOVE, J. W.—*The Ridley Centenary*. Government Printer, Singapore, 1955.

PURSEGLOVE, J. W.—Mr. Ridley's hundredth birthday. *Nature*, 176, 1092–1093.

PURSEGLOVE, J. W.—Plants for the amateur—I. *Crotalaria retusa*, *M.A.H.A. Mag.*, XII, No. 4, 7–11.

PURSEGLOVE, J. W.—Ridley, Malaya's greatest naturalist. *Malayan Nature J.*, X, 43–55.

PURSEGLOVE, J. W.—Botany's contribution to a country's economy. *Sarawak Tribune*, 22-9-55.

SINCLAIR, J.—A revision of the Malayan Annonaceae. *Gardens' Bull.*, XIV, 149–516.

APPENDIX I

STAFF OF BOTANIC GARDENS, 1955

DIVISION 1-III

<i>Appointment</i>	<i>Name</i>	<i>Remarks</i>
Director ...	J. W. Pursglove, B.Sc., A.I.C.T.A., F.L.S.	
Assistant Director ...	H. M. Burkill, M.A., F.L.S.	
Keeper of Herbarium ...	J. Sinclair, B.Sc.	
Assistant Botanist ...	C. X. Furtado, D.Sc.	
Curators (2) ...	J. W. Ewart ...	On leave 4-12-54 to 18-1-55
	G. H. Addison	
Laboratory Assistant (Special Grade) ...	J. L. Pestana	
Horticultural Assistant ...	A. G. Alphonso ...	On training Course in U.K. (Kew).
Herbarium and Museum Assistant ...	Haji Mohd. Nur bin Mohd. Ghous, B.E.M.	
Laboratory Assistant ...	Bajuri bin Sappan	
Artist ...	Juraimi bin Samsuri	
Clerks ...	Loh Fon Sen ...	Until 31-5-55
	F. A. Pereira ...	From 1-6-55
	Vincent D' Rozario ...	From 3-1-55
	Miss Celine Schelkis	
Despatch Clerk ...	R. Raphael	
Stenographer ...	Miss Diana Foo	
Library Assistant ...	Dr. (Mrs.) A. Johnson ...	From 1-2-55 to 15-9-55
Junior Horticultural Assistant	Abdul Aziz bin Pakiri	
Junior Horticultural Assistant (Govt. House Domain) ...	Wong Siew Hang	
Storekeeper ...	Ismail bin Ahmad	

METEOROLOGICAL RECORDS

BOTANIC GARDENS, SINGAPORE 1955

Readings Daily at 2.00 hrs. G.M.T. = 9.30 a.m. Local Time

Month	TEMPERATURES					Mean Rel. Humidity	RAINFALL			
	Mean Temp. at 9.30 a.m.	Highest Max. Temp.	Lowest Min. Temp.	Mean Max. Temp.	Mean Min. Temp.		Rainfall	Average 1945-55 11 Years	Highest Rainfall in 24 hrs.	Number of days
	°F	°F	°F	°F	°F		in.	in.	in.	
January	78.3	87.5	71.5	83.7	73.4	85.8	23.83	11.39	3.30	22
February	80.4	89.5	71.8	87.1	73.9	79.3	3.16	9.04	1.72	10
March	80.9	90.0	71.5	88.2	74.4	77.9	3.27	9.56	1.25	10
April	81.9	91.5	73.0	88.7	75.1	81.5	8.46	10.09	1.75	21
May	83.6	96.0	72.0	90.7	75.7	80.0	5.02	7.40	1.20	13
June	81.8	92.5	72.5	88.4	75.8	83.8	4.47	6.52	0.85	16
July	80.4	91.0	72.0	86.6	72.0	84.2	7.14	6.96	5.20	15
August	79.3	89.5	71.2	85.3	74.8	85.0	10.09	7.20	3.20	19
September	78.9	90.5	72.0	86.3	74.7	81.4	7.82	7.60	3.20	15
October	81.4	90.5	72.0	86.6	74.0	83.0	7.79	7.29	1.30	24
November	81.4	90.0	72.5	86.3	74.5	81.0	7.17	10.06	2.40	20
December	82.8	88.5	71.5	85.0	72.9	78.1	14.13	11.98	3.64	22
Total or Mean	80.9	96.0	71.2	86.9	74.3	81.7	102.35	105.09	5.20	207

APPENDIX III

PLANTS AND SEEDS RECEIVED DURING 1955 FROM THE FOLLOWING INSTITUTIONS AND PERSONS, AND ARE GRATEFULLY ACKNOWLEDGED

Algeria	...	Jardin d'Eassai, Hamma.
Argentina	...	Mr. Victor Hanchildt, Puerto Naranjito, Misiones.
Australia	...	Mr. York Meredith, Sydney; Mr. Edward Pulloch, Parkes, N.S.W.
Bahamas	...	Mrs. Authur Langlois, Nassau.
Belgium	...	Botanic Gardens, Antwerp.
British North Borneo	...	Mr. Veitch, Sandakan.
Canada	...	Botanic Gardens, Montreal.
East Africa	...	Mr. C. S. Brisbane.
France	...	Botanic Gardens of Nantes and Rond-Point de Chamars.
Germany	...	Botanic Gardens of Bonn, Darmstadt, Frankfurt-am-Main, Hamburg and Mainz University.
Hawaii	...	Mr. Wm. Kirch, Honolulu.
Holland	...	Botanic Gardens of Amsterdam and Utrecht.
India	...	Forest Research Institute, Dehra Dun; National Botanic Gardens, Lucknow.
Indo-China	...	Her Britannic Majesty's Ambassador to Laos.
Italy	...	Instituto Technico "Zanon", Udine.
Japan	...	Dr. Ueno, Kyoto University; Mr. Y. Miyasaki, Izu-Bunjo; Kyoto-Takeda Herbal Garden; Izu Pharmaceutical Garden; Osaka University.
Malaya	...	Mr. E. F. Allen, Kuala Lumpur; Mrs. F. G. H. Allen, Singapore; Mr. R. C. Barnard, Kepong, Mr. E. F. Brady, Singapore; Mrs. J. C. Cooke, Singapore; Mr. D. C. Doo, Singapore; Dr. Drenth, Singapore; Mrs. M. Ewart, Singapore; Mr. Emile Galistan, Singapore; Mrs. E. J. Henton, Singapore; Mr. J. A. le Doux, Kota Tinggi; Dr. K. L. Mah, Singapore; Singapore Gardening Society; Mr. Tan Chye Siam, Singapore; University of Malaya; Mrs. Wratten, Singapore; Dr. Wycherley, Kuala Lumpur; Mrs. Young, Singapore.
Malta	...	Argotti Botanic Gardens.
New Guinea	...	Department of Forests.
New Zealand	...	Auckland Museum.
Nigeria	...	University College, Ibadan.
Poland	...	Panstwowy Instytut Naukowy.
Portugal	...	Coimbra University; Museo Abicola do Ultramar.
Sarawak	...	Forest Department.
South Africa	...	National Botanic Gardens; Kirstenbosch.
Spain	...	Botanic Gardens, Barcelona.
Sweden	...	Botanic Gardens of Gottingen and Uppsala University.
Switzerland	...	University of Basel.
Trinidad	...	Imperial College of Tropical Agriculture.
United Kingdom	...	Royal Botanic Gardens, Edinburgh.
U.S. of America	...	Dr. A. Bernhardt, Brooklyn; Mr. E. A. Menninger, Florida; U.S. Department of Agriculture.



